[1][a] $-3+5-7+9-11+13=6$

[b] $\frac{2}{4n^2-1}, \frac{1}{n^2} > 0$

$$\lim_{n\to\infty} \frac{\frac{2}{4n^2-1}}{\frac{1}{n^2}} = \lim_{n\to\infty} \frac{2n^2}{4n^2-1} = \lim_{n\to\infty} \frac{2}{4-\frac{1}{n^2}} = \frac{2}{4-0} = \frac{1}{2} \neq 0$$

$\sum_{n=1}^{\infty} \frac{1}{n^2}$ CONV (p-SERIES $p=2>1$)

SO, $\sum_{n=1}^{\infty} \frac{2}{4n^2-1}$ CONV (LIM COMP) (*)

[c] LET $f(x) = \frac{2^x}{x^2+1}$

$$f'(x) = \frac{(2^x \ln 2)(x^2+1) - 2^x(2x)}{(x^2+1)^2}$$

$$= \frac{2^x((\ln 2)(x^2+1)-2x)}{(x^2+1)^2} = \frac{2^x(\ln 2)(x-1)^2}{(x^2+1)^2} > 0$$

INCREASING

[2][a] $\frac{\cos^2 n}{100n+n^4}, \frac{1}{n^4} > 0$ (1/2)

$$\lim_{n\to\infty} \frac{\frac{\cos^2 n}{100n+n^4}}{\frac{1}{n^4}} = \lim_{n\to\infty} \cos^2 n \left(\frac{n^4}{100n+n^4}\right)$$

$$= \lim_{n\to\infty} \underbrace{\cos^2 n}_{\neq 0} \underbrace{\left(\frac{1}{\frac{100}{n^3}+1}\right)}_{\to 1} \neq 0$$

$\sum_{n=1}^{\infty} \frac{1}{n^4}$ CONV (p-SERIES) (1/2)

SO $\sum_{n=1}^{\infty} \frac{\cos^2 n}{100n+n^4}$ CONV

[b] $\frac{600n+2^n}{6^n+200n} > 0, \quad \frac{2^n}{6^n} > 0$ (1)

$$\lim_{n\to\infty} \frac{600n+2^n}{6^n+200n} \cdot \frac{6^n}{2^n} = \lim_{n\to\infty} \frac{600n+2^n}{2^n} \cdot \frac{6^n}{6^n+200n}$$

(1)

$$= \lim_{n\to\infty} \left(\frac{600n}{2^n}+1\right)\left(\frac{6^n}{6^n+200n}\right) \quad (*)$$

$$= (0+1)(1) = 1 \neq 0$$

($\frac{1}{2}$) ($\frac{1}{2}$)

$$\sum_{n=1}^{\infty} \frac{2^n}{6^n} = (\tfrac{1}{2}) \sum_{n=1}^{\infty} \left(\frac{1}{3}\right)^n \text{ CONV (GEOMETRIC } |r|<1) \quad (*)$$

SO $\sum_{n=1}^{\infty} \frac{600n+2^n}{6^n+200n}$ CONV (LIM COMP) ($\frac{1}{2}$)

[c] $\lim_{n\to\infty} \left(1-\sin\frac{2}{n}\right)^n = (1-\sin 0)^{\infty} = 1^{\infty} = 1 \neq 0$ (*)

$\sum_{n=1}^{\infty} \left(1-\sin\frac{2}{n}\right)^n$ DIV (DIV TEST)

(*)

Course	Student ID	Test
MATH 1C	112358 13	QUIZ 1

Question	1a	1b	1c
Points	0		

Question	2a	2b	2c
Points	1		

Total	

Self Assessment [2 POINTS]

Based on your work on the prerequisites review packet and your performance on this quiz, what prerequisite skills should you improve on ?

INDETERMINATE LIMITS, L'HÔPITAL'S RULE

FOLLOW LECTURE INSTRUCTIONS ON HOW TO SHOW WORK

WRITE TERMS OF SEQUENCE (CAREFULLY)